

WHAT IS CLAIMED IS:

1. An apparatus comprising a circuit that includes:
a first portion which is coupled between first and
5 second nodes and which includes a resonant tunneling
device;

10 a second portion which is coupled between said first
and second nodes and which has an electrical reactance
that includes at a selected frequency a complex conjugate
reactance of a reactance of said resonant tunneling
device at said selected frequency, so that at said
selected frequency said complex conjugate reactance
substantially cancels said reactance of said resonant
tunneling device.

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2. An apparatus according to Claim 1, wherein said
resonant tunneling device is a resonant tunneling diode.

20 3. An apparatus according to Claim 1, wherein said
first portion includes a further resonant tunneling
device, said resonant tunneling devices being coupled in
series with each other between said first and second
nodes.

25 4. An apparatus according to Claim 1, wherein said
selected frequency is greater than 100 GHz.

30 5. An apparatus according to Claim 1, wherein said
second portion includes an inductor which is coupled
between said first and second nodes, said complex
conjugate reactance including an inductance of said
inductor.

6. An apparatus according to Claim 5, including a blocking capacitor, said inductor and said blocking capacitor being coupled in series with each other between 5 said first and second nodes.

7. An apparatus according to Claim 1, wherein said second portion includes a transmission line having two conductors which are respectively coupled to said first 10 and second nodes, said complex conjugate reactance including an inductance of said transmission line.

8. An apparatus according to Claim 7, wherein said transmission line is an open line having an electrical 15 length which is between one-quarter and one-half of the wavelength of said selected frequency.

9. An apparatus according to Claim 7, wherein said transmission line is a shorted line having an electrical 20 length which is less than one-quarter of the wavelength of said selected frequency.

10. An apparatus according to Claim 9, including first and second blocking capacitors which are each 25 coupled between a respective terminal of said resonant tunneling device and a respective said conductor of said transmission line.

11. An apparatus according to Claim 1, including a transformer having first and second coils, said second coil being coupled between said first and second nodes
5 and being part of said second portion of said circuit, said complex conjugate reactance including an inductance of said second coil.

12. An apparatus according to Claim 1, wherein said second portion includes a plurality of components with
10 respective impedances that collectively define said complex conjugate reactance, said plurality of components including at least one inductor and at least one capacitor.

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13. An apparatus according to Claim 1, wherein said reactance of said resonant tunneling device includes an intrinsic capacitance and a terminal reactance of said resonant tunneling device.

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14. An apparatus according to Claim 1, wherein said reactance of said resonant tunneling device includes an intrinsic capacitance of said resonant tunneling device but excludes a terminal reactance of said resonant tunneling device.

15. A method of operating a circuit that includes a first portion which is coupled between first and second nodes and which includes a resonant tunneling device, and
5 a second portion which is coupled between said first and second nodes, said method comprising:

causing said second portion to exhibit at a selected frequency an electrical reactance that includes a complex conjugate reactance of a reactance of said resonant tunneling device at said selected frequency, so that said complex conjugate reactance substantially cancels said reactance of said resonant tunneling device at said selected frequency.
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15 16. A method according to Claim 15, including selecting a resonant tunneling diode to serve as said resonant tunneling device.

20 17. A method according to Claim 15, including selecting a frequency in excess of 100 GHz to be said selected frequency.

25 18. A method according to Claim 15, including configuring said second portion to have an inductor which is coupled between said first and second nodes, said complex conjugate reactance including an inductance of said inductor.

19. A method according to Claim 15, including
configuring said second portion to have a transmission
line with two conductors that are respectively coupled to
5 said first and second nodes, said complex conjugate
reactance including an inductance of said transmission
line.

10 20. A method according to Claim 15, wherein said
selecting of said reactance of said resonant tunneling
device is carried out to include an intrinsic capacitance
and a terminal reactance of said resonant tunneling
device.

15 21. An apparatus according to Claim 15, wherein
said selecting of said reactance of said resonant
tunneling device is carried out to include an intrinsic
capacitance of said resonant tunneling device and to
exclude a terminal reactance of said resonant tunneling
20 device.